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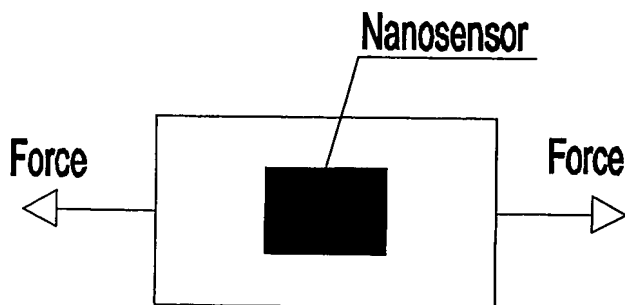
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(54) Title: SMART MATERIALS: STRAIN SENSING AND STRESS DETERMINATION BY MEANS OF NANOTUBE SENSING SYSTEMS, COMPOSITES, AND DEVICES



(57) **Abstract:** The present invention is directed toward devices comprising carbon nanotubes that are capable of detecting displacement, impact, stress, and/or strain in materials, methods of making such devices, methods for sensing/detecting/monitoring displacement, impact, stress, and/or strain via carbon nanotubes, and various applications for such methods and devices. The devices and methods of the present invention all rely on mechanically-induced electronic perturbations within the carbon nanotubes to detect and quantify such stress/strain. Such detection and quantification can rely on techniques which include, but are not limited to, electrical conductivity/conductance and/or resistivity/resistance detection/measurements, thermal conductivity detection/measurements, electroluminescence

detection/measurements, photoluminescence detection/measurements, and combinations thereof. All such techniques rely on an understanding of how such properties change in response to mechanical stress and/or strain.

WO 2004/065926 A1